


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CDK2152		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/GB2004/000056		International filing date (day/month/year) 12.01.2004		Priority date (day/month/year) 29.01.2003
International Patent Classification (IPC) or national classification and IPC A01N57/34, D21H21/36, D21H19/46, D21H19/58, D21H19/64, C09C1/02, C04B14/28				
Applicant RHODIA CONSUMER SPECIALTIES LIMITED				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 12.11.2004		Date of completion of this report 20.05.2005		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Muellners, W Telephone No. +31 70 340-3289		



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INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITYInternational application No.
PCT/GB2004/000056**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-5 as originally filed

Claims, Numbers

1-19 received on 12.11.2004 with letter of 09.11.2004

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/000056

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/GB2004/000056

Re Item V.

The following documents (D1-D9) are referred to in this report:

D1: WO 02/08127 A
D2: US-B-6 180 0561
D3: WO 99/33345 A
D4: WO 00/04777 A
D5: US-A-4 673 509
D6: EP-A-0 839 956
D7: US-A-3 597 251
D8: US-A-3 945 843
D9: EP-A-1 160 201

For the clarity (Article 6 PCT) and interpretation of the claims underlying this reasoned statement see below under item VIII.

Novelty

The present application meets the criteria of Article 33(1) PCT, because the subject-matter of claims 1-19 is new in the sense of Article 33(2) PCT.

1. Independent claim 1 relates to the use of a composition comprising a tetrakis(hydroxyorgano)phosphonium salt and dispersants selected from two different classes for preserving an inorganic slurry while maintaining it in a substantially homogenous phase.

Independent claims 16 and 17 are directed to more specific compositions per se. Claim 19 claims corresponding methods involving the use of claim 1 of compositions according to claims 16 and 17.

2. Document D1 discloses (see the passages cited in the International search report) compositions comprising THP salts and aminophosphonate chelant to treat iron sulphide deposits. The aminophosphonate may for instance be amino-(trimethylenephosphonate) which is synonymous to the nitrilo-tris-(methylenephosphonate) of claim 5 of the present application. The composition of

document D1 may further comprise scale and corrosion inhibitors like polyacrylates, which are dispersants of type (ii) of the present application.

Document D2 discloses (see the passages cited in the International search report) compositions for controlling "colloidal" and biological fouling comprising THPS and an antiscalant like polyacrylic acid or a phosphonate, e.g. amino tri(methylenephosphonic acid).

Document D3 discloses (see the passages cited in the International search report) synergistic biocidal compositions comprising THPS and a non-surfactant penetrant / hydrotrope / syntan, like for instance polyacrylic acid, for treating water in e.g. ceramic manufacture and surface coating. The compositions may for instance be added to aqueous based products, e.g. paints.

However, the use of the compositions as disclosed in these documents (see above) is not the use claimed in independent claim 1 of the present application, i.e. for preserving an inorganic slurry while maintaining it in a substantially homogenous phase.

3. For assessing novelty of the compositions per se claimed in claims 16 and 17 and the method of claim 19 the indication of the intended use or purpose is only of relevance in as far as it implies that the compositions have to be suitable for the indicated use and the process suitable for achieving the intended result.

The compositions of D1 for instance seem in principal to be suitable for treating inorganic slurries - in fact it is proposed in D1 to mix the compositions with solid carrier (e.g. silica, talc).

However, none of the documents discloses a composition comprising tetrakis(hydroxyorgano)phosphonium salt and the tetra sodium salt of nitrilo-tris(methylene phosphonate) (claim 16) or a tetrakis(hydroxymethyl)phosphonium salt and an acrylic acid homopolymer having a molecular weight of 2,000-5,000 (claim 17).

D1 mentions among the suitable chelants nitrilo-tris-(methylenephosphonate), and also that the chelants may be employed as i.a. sodium salts (see D1, page 4, line 25-page 5,

line 9; claims 8, 9, 13, and 14). But nitrilo-tris-(methylenephosphonate) is not among the preferred chelants, let alone that the tetra sodium salt is specifically suggested. Polyacrylic acid is only mentioned among the optionally added scale or corrosion inhibitors (D1, page 14, lines 19-23), a molecular weight range is not specified.

Analogous considerations apply for the disclosure of D2 and D3.

Therefore, the subject-matter of independent claims 16 and 17, and consequently also the subject-matter of the independent process claim 19, is also new over the disclosure of documents D1-D3.

D4-D9 do already not disclose the more general composition referred to in claim 1. They can therefore not be novelty destroying for the subject-matter of any claim either.

Inventive Step

The present application meets the criteria of Article 33(1) PCT, because the subject matter of claims 1-19 involves an inventive step in the sense of Article 33(3)PCT.

The problem underlying the present application can be seen as providing a biocidal THP salt composition for treating inorganic slurries which do not lead to instantaneous heterogenous thickening and aggregation of the slurry and a corresponding method for minimising bacterial contamination of such slurries using said composition.

The proposed solution is characterised by the use of certain types of dispersants which apparently suppress the negative effect of certain THP salts on the homogeneity of such slurries.

The closest prior art is the known practice of adding THP salts to such slurries to which the description is referring (cf. page 1, lines 25-26) and for which document D4 is an example. Document D4 specifically proposes the use of THPS in synergistic mixture with peroxyacetic acid for slime control in paper making and for controlling bacterial and fungal growth in clay and pigment slurries (see D4, the passages cited in the international search report). Document D5 discloses a liquid scourer formulation comprising synthetic clay and calcium carbonate in combination with THPS, to which antiscaling agents like aminophosphonate and polyacrylates may be added.

The skilled person when preparing inorganic slurries with a high content of solids, for instance of calcium carbonate for coating paper, routinely adds dispersants in order to achieve a homogenous phase and to lower the viscosity. Documents D6-D9 (see the passages cited in the international search report) teach that dispersants, i.e. of types specified in the present application, which are also known as scale and corrosion inhibitors are in principle suitable and in fact commonly used for this purpose.

It is also common practice to add THP salts as microbicidal agents to such slurries

However, due to chemical and physical interactions and interrelations which are difficult to predict, one cannot randomly select biocides and dispersants among those commonly used and expect that they can be successfully used together.

Instead it requires the exercise of inventive skill (or an undue amount of experimentation) to identify combinations which do allow to preserve a slurry against bacterial contamination while at the same time maintaining it in a substantially homogenous phase, i.e. which allow the solution of the underlying problem.

Notwithstanding the reservations below under item VIII, the claimed subject-matter represents such a non-obvious solution.

Industrial Applicability

The subject-matter of claims 1-19 is considered to be industrially applicable (Article 33(1) and (4) PCT)

Re item VIII.

Clarity and interpretation of the claims (Article 6 PCT)

1. Claim 15 is a so called omnibus claim which does not meet the requirements of Article 6 PCT in conjunction with Rule 6.2a.

In the following the claim is discussed in as far as it can be considered to cover the same subject-matter as claims 1-14, i.e. as if its scope was identical to that of independent claim 1.

2. Independent Claims 1, 16, 17 and 19 are not sufficiently supported by the description

as required by Article 6 PCT, as their scope is broader than justified by the description. The term tetrakis(hydroxyorgano)phosphonium salt covers any salt of any tetrakis-organophosphonium cation having a hydroxy substituent. On one hand the invention is related to counteracting the negative influence THP salts may have on the rheological behaviour of slurries while on the other hand in particular the nature of the organo group will be decisive for said influence on the rheological behaviour. Further, while it can be expected that the "simple" anions specified in the description, i.e. sulphate, chloride, phosphate, nitrate and oxalate, have little influence on the rheological behaviour, the claims cover any anion, thus also anions which are likely to have considerable impact. The description demonstrates that dispersants specified in independent claims 1, 16, 17 and 19 can overcome the instant heterogeneous thickening caused by tetrakis(hydroxymethyl)phosphonium sulphate (THPS) and one can reasonably expect, based on this evidence, that also the chloride, phosphate, nitrate and oxalate of tetrakis(hydroxymethyl)phosphonium successfully works. But the description as originally filed does not support the assumption that said dispersants can actually overcome the alleged negative effect of any THP salt, having cations and/or anions of completely different character and complexity than THPS.

In fact, if one would assume that the combination of any THP salt within the definition of the independent claims with any dispersant within the definition of the independent claims would actually solve the underlying problem, then arriving at solutions to the problem would not require the exercise of inventive skill. It would instead amount to providing premixes comprising both a commonly used bactericide and a commonly used dispersant, as an obvious alternative to adding these obligatory components separately to an inorganic slurry, for which it is evidently desirable to be homogenous and not bacterially contaminated.

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6CLAIMS

1. Use of a composition comprising:

5 (a) a tetrakis(hydroxyorgano)phosphonium salt (herein THP⁺ salt);

and

(b) a dispersant selected from the group consisting of:

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(i) phosphonated compounds containing at least one tertiary nitrogen atom; and

(ii) homopolymers of unsaturated acids;

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for treating an inorganic slurry to maintain the slurry in a substantially homogeneous phase and to preserve the slurry against bacterial contamination.

20 2. Use according to Claim 1, in which the THP⁺ salt is tetrakis(hydroxymethyl)phosphonium sulphate.

3. Use according to Claim 1, in which the THP⁺ salt is tetrakis(hydroxymethyl)phosphonium chloride, phosphate, nitrate or
25 oxalate.

4. Use according to any one of Claims 1 to 3, in which the dispersant (b(i)) is a phosphonated compound containing one tertiary nitrogen atom.

30 5. Use according to Claim 4, in which the dispersant (b(i)) is a sodium salt of nitrilo-tris(methylene phosphonate).

6. Use according to Claim 5, in which the salt is the tetra-sodium salt.
- 5 7. Use according to any one of Claims 1 to 3, in which the dispersant (b(ii)) is a homopolymer of acrylic acid.
8. Use according to Claim 7, in which the homopolymer has a molecular weight in the range 2000 to 5000.
- 10 9. Use according to any one of Claims 1 to 8, wherein an effective amount of the composition is added to the slurry.
- 15 10. Use according to Claim 9, in which the ratio of THP⁺ salt to dispersant in the composition is about 2:1 (as active ingredients).
11. Use according to Claim 9 or 10, in which the composition is added to the slurry in an amount in the range 10ppm to 1000ppm (by weight of the slurry).
- 20 12. Use according to Claim 11, in which the composition is added to the slurry in an amount of about 750ppm (by weight of the slurry).
13. Use according to any one of Claims 9 to 12, in which the slurry
- 25 comprises a calcium carbonate-based slurry.
14. Use according to any one of Claims 9 to 12, in which the slurry comprises a pigment slurry, a clay slurry or a cement slurry.

15. Use of a composition comprising THP⁺ salt and dispersant for treating an inorganic slurry, substantially as hereinbefore described with reference to the Examples.

5 16. A composition for treating an inorganic slurry, the composition comprising:

(a) a tetrakis (hydroxyorgano) phosphonium salt (herein THP⁺ salt) and

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(b) a dispersant which is the tetra sodium salt of nitrilo-tris (methylene phosphonate).

15 17. A composition for treating an inorganic slurry, the composition comprising:

(a) a tetrakis(hydroxymethyl)phosphonium salt (herein THP⁺ salt) and

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(b) a dispersant which is a homopolymer of acrylic acid, the homopolymer having a molecular weight in the range of 2,000 to 5,000.

18. A composition according to Claim 16 or 17, wherein the THP⁺ salt is tetrakis(hydroxymethyl)phosphonium sulphate.

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19. A method of treating an inorganic slurry to maintain the slurry in a substantially homogeneous phase and to preserve the slurry against bacterial contamination, comprising the addition to the slurry of an effective amount of a composition according to any one of Claims 16 to

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18.